

Five pearl millet genepools in Niger

B.B. Singh ^{1/} and N. Jika ^{2/}

SUMMARY

Five genepools of pearl millet (*Pennisetum americanum* L. Leake.) have been developed by the International Crops Research Institute for the Semi-Arid Tropics, India and Institut National de Recherches Agronomiques du Niger. The genepools will conserve material and provide breeders with a wide amount of variability in this crop. Four varieties from one of the genepools have shown promise in trials in Niger and other Sahelian countries.

Five genepools of pearl millet (*Pennisetum americanum* L. Leake.), labelled INMG 1, 2, 3, 4 and 5, have been developed jointly by the International Crops Research Institute for the Semi-arid Tropical (ICRISAT) and Institut National de Recherches Agronomiques du Niger (INRAN) cooperative programme in Niger, west Africa during 1978 to 1984. The development of these genepools was aimed at conserving the material and providing pearl millet breeders with the widest variability available in germplasm accessions and breeding materials in this crop.

Each of these genepools were developed by grouping together pearl millet germplasm accessions and breeding materials originating from similar agro-climatic regions with considerable variation for head length, head shape and maturity. For effective recombination between the constituent genotypes of each pool, random mating was practised following the system proposed by M.N. Harrison in Kenya for maize as described by Andrews *et al.* (1987). This procedure required the development of a pollinator bulk using equal quantities seed of the constituent genotypes, planting rows of each constituent genotype alternatively with rows of bulk, harvesting in the constituent genotype rows and repeating the procedure. To avoid gene losses during recombination, at least one head per plant was sampled in each constituent rows, and bulked to

provide constituent genotypes for the next recombination cycle (Burton, 1978).

To achieve effective recombination, 3-5 cycles of random mating were made. At the last random mating generation, constituent rows and pollinator bulk could not be distinguished morphologically, indicating that sufficient recombination among the component genotypes had been achieved.

The origin of the five genepools is as follows.

INMG 1

This genepool was developed by four random matings involving 123 accessions from Burkina Faso, Mali, Niger, Nigeria, Senegal and elite breeding material of West African origin, possessing ear head lengths of 40+ cm.

INMG 2

This genepool was developed by four random matings from 208 germplasm accessions and breeding materials with shorter heads and having more productive tillers than the components of INMG 1, originating from India, east and west Africa.

INMG 3

This was developed by four random matings from 73 tall segregants resulting from d_2 dwarf populations and their crosses with west African cultivars.

INMG 4

This was developed by five random matings from 51 genotypes of African origin having bristled ear heads.

INMG 5

This was developed by three random matings involving 59 genotypes with relatively

^{1/} ICRISAT-Niger Cooperative Programme, BP 240, Narddi, Niger. Presently in the Department of Genetics and Plant Breeding, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi 221005, India

^{2/} Institut National des Recherches Agronomiques du Niger, BP 240, Narddi, Niger

(40 cm) and thicker ear heads representing land races of Mali, Niger, Togo, Uganda and the progenies derived from their crosses.

The agronomic characteristics of the five gene pools are given in Table 1.

Seed of these gene pools and the varieties developed from them is maintained at the Centre National de Recherches Agronomiques (CNRA) at Maradi and at the ICRISAT Sahelian Center at Niamey, in Niger. 25-50 g of bulk seed of these may be provided on request to the

Table 1. Agronomic characteristics of ICRISAT-Niger millet gene pools

Gene pool	Days to flowering		Plant height (cm)		Ear length (cm)		Ear girth (cm)		1000 grain weight (g)	Grain yield (kg/ha)
	Mean	Range	Mean	Range	Mean	Range	Mean	Range		
INMG 1	58	50-73	240	140-310	50	40-72	8.0	5-12	9.0	1540
INMG 2	55	50-65	230	25-300	40	20-75	8.7	6-12	8.0	1920
INMG 3	59	50-70	230	130-315	50	30-80	8.0	6-10	9.5	1400
INMG 4	55	50-65	250	170-320	55	40-80	8.0	7-11	9.0	1650
INMG 5	59	50-70	230	185-270	35	25-60	9.5	7-13	9.5	1950

The gene pools should conserve variability for various agronomic characters and as such exhibit a good level of resistance to downy mildew (*Sclerospora graminicola*). Components of these gene pools have shown tolerance to other biotic and physical stresses including drought. Four varieties from these pools, ITMV 8001, 8002, 8003 and 8304 from INMG 5 by grided mass selection. These have been recommended for cultivation in Niger since 1985. Variety ITMV 8003 derived from INMG 2 has been recommended by Institut du Sahel for extension to farmers in the Comité Permanent Interstats de Lutte Contre la Secheresse dans le Sahel (CCILSS) countries of east Africa.

pearl millet breeders at the ICRISAT Sahelian Center, BP 12404, Niamey, Niger and CNRA, BP 240, Maradi, Niger.

REFERENCES

Andrews, D.J., Verma, B.N. and Hare, B.W. 1977. Methods of population improvement in pearl millet and sorghum. Second FAO/SIDA seminar on food crops in Africa and Near East. Lahore, Pakistan, 18 Sept.- 3 Oct. 1977. FAO, Rome.

Burton, G.W. 1978. Gene loss in pearl millet germplasm pools. Crop Sci., 18:291-295.

Niamey

Banque de gènes pour cinq variétés de mil chandelle au Niger

Cinq variétés de mil chandelle (*Pennisetum americanum* L. Link) ont été mises au point par l'Institut International de recherche végétale pour les zones tropicales semi-arides (IITA) et par l'Institut National de recherche agronomique du Niger. Grâce à cette banque de gènes, on pourra conserver ce matériel et donner aux obtenteurs de vastes possibilités de variation pour cette culture. Quatre de ces variétés ont donné des résultats prometteurs lors d'essais effectués au Niger et dans d'autres pays sahéliens.

Resumen

Creación de cinco fondos genéticos de milo paria en Niger

El Instituto Internacional de Investigación de Cultivos para las Zonas Tropicales Semiáridas, India, y el Instituto Nacional de Investigación Agronómica de Niger han creado cinco fondos genéticos de milo paria (*Pennisetum americanum* L. Link). La finalidad es conservar el material y proporcionar a los mejoradores una gran variabilidad de este cultivo. Cuatro variedades de semillas del "paria" han dado resultados prometedores en pruebas realizadas en Niger y otros países sahelianos.